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Implicit Discrimination in Hiring – Real World Evidence

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CReAM Discussion Paper No 05/07

Implicit Discrimination in Hiring – Real World Evidence

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Non-Technical Abstract

This is the first study providing evidence of a new form of discrimination, implicit discrimination, acting in real economic life. In a two-stage field experiment we first measure the difference in callbacks for interview for applicants with Arab/Muslim sounding names compared to applicants with Swedish sounding names using the correspondence testing methodology. In the second stage of the experiment we measure, for a sample of the recruiters involved, their explicit and implicit attitudes/performance stereotypes by the means of explicit questions and the implicit association test (IAT). We find (i) only weak correlations between explicit attitudes/performance stereotypes and implicit performance stereotypes but (ii) a strong and statistically significant negative correlation between the implicit performance stereotypes and the callback rate for an interview for applicants with Arab/Muslim sounding names, but not for applicants with Swedish sounding names. These results indicate that implicit discrimination acts differently compared to explicit discrimination and that it is an important determinant of the hiring process.

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Implicit Discrimination in Hiring - real world evidence*

by

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Abstract: This is the first study providing evidence of a *new* form of discrimination, implicit discrimination, acting in real economic life. In a two-stage field experiment we first measure the difference in callbacks for interview for applicants with Arab/Muslim sounding names compared to applicants with Swedish sounding names using the correspondence testing methodology. In the second stage of the experiment we measure, for a sample of the recruiters involved, their explicit and implicit attitudes/performance stereotypes by the means of explicit questions and the implicit association test (IAT).

We find (i) only weak correlations between explicit attitudes/performance stereotypes and implicit performance stereotypes but (ii) a strong and statistically significant negative correlation between the implicit performance stereotypes and the callback rate for an interview for applicants with Arab/Muslim sounding names, but not for applicants with Swedish sounding names. These results indicate that implicit discrimination acts differently compared to explicit discrimination and that it is an important determinant of the hiring process.

JEL classification: J64, J71

Key words: Implicit attitudes, discrimination, exit from unemployment

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1. Introduction

Increasing attention has been given in economics to factors previously expected to be unrelated to productivity, such as beauty, and to non-cognitive skills, such as self-discipline, and how employers value these attributes.[1] Following this empirical line of research the search for *theories* explaining why employers attach prices to such characteristics have increased. Especially explanations taken from the field of social psychology have gained momentum in economics.

For long social psychologists (and economists) have assumed that social behavior is under our conscious control and therefore can be evaluated by explicit introspective evaluation. However, considerable evidence now supports the view that a person's attitudes and stereotypes in fact often operates in an implicit/unconscious mode (see Nosek et al., 2007). Recently, such unconscious attitudes have been suggested to also explain discrimination in the labor market, challenging the well known concepts of "taste-based" and "statistical" discrimination.[2] In the article "New approaches to discrimination – implicit discrimination" the authors suggest that individuals' unconscious mental associations, or implicit attitudes, could exist together with explicit attitudes to explain discriminatory behaviour in the labor market, and especially so in the hiring process (see Bertand et al, 2005). This suggests that discriminatory behavior sometimes is unintentional and outside the discriminators' awareness.

To what extent implicit discriminatory attitudes (or stereotypes) are in fact correlated with discriminatory behaviour in the hiring situation have so far only been studied in laboratory settings. For instance, Ziegert and Hanges (2005), find that an implicit racist attitude, interacted with a climate for racial bias, predicts discriminatory behaviour, while an explicit counterpart does not. Our study is the first, in our knowledge, that in fact studies this correlation in a real hiring situation. In doing so we combine two research projects, one in economics and the other in social psychology, to analyze whether implicit stereotypes of the recruiter/employer

[1] See for instance Hamermesh and Biddle (1994) and Heckman and Rubinstein (2001) for research on the return to beauty and to non-cognitive skills, respectively.
[2] See Altonij and Blank (1999).

is correlated with that him/her having discriminated against ethnic minority applicants when inviting job candidates for an interview.

Carlsson and Rooth (2007) tested for ethnic discrimination in hiring using the correspondence testing method (see Riach and Rich, 2002). This method implies, for this particular case measuring ethnic discrimination, that the researcher sends two job applications with identical skills to advertised job openings with the only difference being that the group belonging is signalled by the name of the applicant – one randomly assigned a Swedish name and the other an Arabic/Muslim name. Discrimination is quantified by the relative callback rates for interview between the two groups. Carlsson and Rooth (2007) applied for 1,552 jobs and found that applicants with a Swedish name received fifty percent more callbacks for an interview.

The development of the implicit association test (henceforth IAT) in the 1990s has made it possible to measure individuals' implicit attitudes or stereotypes, see Greenwald et al (1998).[3] In Agerström et al (2007) an IAT in Swedish was developed in order to measure implicit performance stereotypes of professional recruiters, selected from the field experiment above, toward the Arabic/Muslim minority. The reason for primarily focusing on implicit stereotypes rather than implicit attitudes is that Åslund and Rooth (2005) found that changes in employer preferences (attitudes) against Arab/Muslims do not manifest themselves in a lower probability to leave unemployment for this group. Hence, negative stereotypes are expected to be more important in the hiring process than negative attitudes.[4]

A total of 193 recruiters participated in the study. A strong and statistically significant negative correlation between the IAT score and the callback rate is found for applicants with Arabic/Muslim sounding names. No such correlation is found for applicants with Swedish sounding names.

The remainder of this article is outlined as follows. Section 2 presents the economic model of the probability of receiving a callback and explicit/implicit

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[3] A recruiter's implicit attitude and implicit stereotype are measured using different IAT tests. However, existing evidence indicate that the two measures are highly correlated. While our project measures recruiters' implicit stereotypes, it might also, to some extent, pick up their implicit attitudes.

[4] However, in an ongoing project we study the importance of implicit attitudes in the hiring decision about ethnic minority applicants.

discrimination. Section 3 presents the situation/correspondence test and its results in more detail, while section 4 presents the implicit association test. Section 5 presents results as regards the correlation between the callback rate for an interview, implicit performance stereotypes (the IAT score) and explicit attitudes and stereotypes. Also, since this study is the first examining the empirical link between implicit discrimination and discriminatory behaviour in the labor market this section includes a quite extensive sensitivity analysis. The final section concludes the paper.

2. A model of implicit and explicit discrimination in hiring

Discrimination in the hiring process could possibly be a result of both conscious, as well as unconscious, negative stereotypes of the minority applicant group, with the latter being activated through automatic mediating brain structures. Say that reading the Arabic/Muslim name of the applicant activates the recruiter's unconscious negative stereotypes of the minority group. Hence, the recruiter attaches an implicit negative value to this application. In the end the negative unconscious association results in that the Arab/Muslim applicant will have a lower probability of being called for an interview compared to a native Swedish applicant. Bertrand et al (2005) argue, based on results taken from social psychology, that implicit stereotypes/attitudes may be especially important determinants in the hiring situation when there is inattentiveness to the task, time pressure and ambiguity. However, which form of discrimination, explicit or implicit, that is the most important determinant in the hiring situation of ethnic minorities is for this study to find out.

Assume that the probability to receive a callback for a job interview and ethnic discrimination have the following relationship for individual *i* belonging to ethnic group *j*:

(1) $$\Pr(Callback = 1)_{ij} = X\beta_j + \delta_j \; ; j\text{=Arab/Muslim or native Swede.}$$

where X is a vector of characteristics in the job application, which by construction of the experiment is the same for both ethnic groups, β_j is the return to those characteristics for

ethnic group *j*, while δ_j is a measure of the degree of ethnic discrimination against group *j*, expected to be zero against native Swedes.

In economics several forms of ethnic discrimination have been modelled (see the survey by Altonji and Blank, 1999). For our purposes we focus on two of those, preference based discrimination and statistical discrimination, both of which can be regarded as explicit forms of discrimination.[5] As mentioned in the introduction the aim of this study is to test whether also implicit forms of discrimination are important in the hiring situation. Hence, we can rewrite Equation 1 as:

$$(2) \qquad \Pr(Callback = 1)_{ij} = X\beta_j + \delta_j^{EP} + \delta_j^{ES} + \delta_j^{I}$$

where the three discrimination terms express explicit preference discrimination, explicit statistical discrimination and implicit discrimination, respectively.

One might wonder if it is possible to divide also the implicit discrimination measure into preferences/attitudes and stereotypes as is done for the explicit discrimination measure. When using a student sample Agerström et al (2007) find that the implicit attitude score and the implicit stereotype score have a correlation of above 0.5 indicating that they measure, if not exactly the same, but then at least highly related constructs.[6] Henceforth we therefore frequently use the term implicit discrimination, which possibly captures negative implicit productivity stereotypes as well as negative implicit attitudes in general.

3. Correspondence testing – ethnic discrimination in hiring

The field experimental data measuring discrimination against the Arabic minority was collected between May 2005 and February 2006 by sending applications to job

[5] For simplicity, even if both preference and statistical discrimination come in several forms we model each of them as a single measure. See Heckman (1998) for a discussion on the identification of different forms of discrimination using the situation testing methodology.

[6] The performance stereotype IAT is the same as the attitude IAT in all instances except for the attribute categories and the associated stimuli. In the attitude IAT the respondents should, as quickly as possible, sort positive and negative words to the attribute categories "positive" and "negative". In the performance stereotype IAT the respondents should instead sort high and low work productivity words to the corresponding attribute categories.

openings in twelve different occupations in the Stockholm and Gothenburg labour market areas. The selected occupations were both skilled and semi/unskilled and included a relatively high as well as a low ratio of immigrants. The selected occupations were computer professionals, business sales assistants, four categories of teachers (preschool, math/science and language in upper level compulsory school, and upper secondary school), accountants, nurses, construction workers, restaurant workers, shop sales assistants and motor-vehicle drivers.

The reason for focusing on the Arab-Muslim ethnic minority is that Swedish studies indicate that discrimination is worst against individuals with such an ethnic background (see Lange, 2000, and Rooth and Ekberg, 2003). Since ethnicity is only signalled through the name the choice of names used in the experiment is crucial. Fortunately, there is a clear distinction between typical Swedish names and Arab/Muslim names. Three of the most frequent Swedish and Arab/Muslim names occurring in Sweden were selected and these were randomly assigned to resumes. The same names were then used in the IAT.

The applications used in the experiment had to be realistic and yet not refer to any real persons. Thus, applicants had identical human capital within occupations and were on average 25-30 years old, had two to four years of work experience in the same occupation as the job applied for and had obtained their education in the same type of school, but at different locations. Through the schooling information it is signalled that the Arab/Muslim applicant is born in Sweden, but has a non-native Swedish name. Further, the application consisted of a quite general biography on the first page and a detailed CV of education and work experience on the second page.

In total Carlsson and Rooth (2007) replied to 1,552 job ads posted at the home-page of the Swedish Employment Agency, see Table A1 in appendix. In 1,030 cases neither applicant was invited and in the remaining 522 cases at least one of the two applicants was invited for interview. Both applicants were invited in 239 cases, while only the Swedish-named applicant was invited in 217 cases and only the Arab/Muslim named applicant in 66 cases. This means that the callback rate of applications with a Swedish-sounding male name was fifty percent, or nine percentage points, higher than for the ones with an Arab/Muslim sounding name.

3.1 Participants in the IAT experiment

The IAT data was collected between August 2006 and January 2007. Hence, there is a severe time delay between when taking the IAT test and when making the hiring decision. However, Lane et al (2007) show that an individual's IAT scores are strongly correlated over time ($r>0.5$).

The first step was to locate the firm's recruiter and, more exactly, the person who was responsible for selecting whom to invite for interview for exactly the job we applied for in the field experiment. This was implemented by calling the firm at the number included in the job ad. This was an extremely labor intensive task, reaching approximately only four recruiters a day. When reached they were informed that we were interested in this specific job vacancy and that we had followed its progress. However, we did not reveal that we had sent fictitious applications. We then informed them that our project intended to study the recruitment process in general and that their participation included taking a "sorting test" on the computer and answering a short questionnaire, without revealing that we intended to measure their attitudes towards/stereotypes of Arab/Muslim minority males.

In an attempt to increase participation and to ensure their focus on the task the employers/recruiters were offered a participation fee of 300 SEK (approximately 33 euros or 38 dollars). They were then told that the fee for participation implies a total devotion to our study for approximately a total of ten minutes during which they were not allowed to be disturbed. Still, recruiters were found to be a very busy group and were hard to convince of participating in the study. A total of 729 employers/recruiters were invited to participate in the study, see Table 1. Fifty-three percent, or 392 employers, were not located or were not interested in participating. In the end, only twenty-six percent, or 193 employers, finally took the IAT. It is a similar share of firms that have participated in each group/category (only Swede/Arab/both/neither invited), except for the category "neither invited". Also, since only a fraction of the group "neither invited" were invited to participate in the study we need to use weights in the analysis of the data. These weights are calculated according to the within group occupational distribution of the field

experiment and therefore also correct for participation differences across groups and occupations.[7]

*** Table 1 ***

3.2 Selective participation

Since three out of four sampled recruiters never participated in taking the IAT it is possible that we have selective participation, which could bias the estimated correlation between implicit discrimination and the callback rate. However, three facts, other than that participation is similar in the experimental subgroups, indicate that selectivity is not an issue. Non-participation seems to be unrelated to the employer/recruiter knowing what we intended to study. We failed to locate or reach approximately twenty-five percent of the recruiters (within a months time) and another twenty-five percent directly stated, without us having informed them about the project, that they did not have the time to participate. Hence, these groups are definitely unaware of our purpose, but could of course still be selective. What about those who agreed to participate but never did? It is clear that no one has started taking the IAT (which is needed in order to realize what the test is about) and then decided to withdraw. Instead, almost half of the recruiters not participating stated having problems to start the program for firm Internet security reasons.[8] Hence, since they have not started taking the IAT they are also unaware of our intentions.

Even so, participation can be selective. However, the IAT scores of the recruiters, both as regards the mean and variance, are almost identical to the ones found for a student sample with zero attrition, see Agerström et al (2007). Even more convincing, when comparing the (unweighted) distribution of observable characteristics of participants and non-participants they are very similar, see Table A2 in appendix. The ethnic difference in callbacks for interview is of about the same

[7] For example, for the nursing occupation we received "neither invited" from 87 employers that we applied for a job to and only 5 of those eventually participated in taking the IAT. The weight was then calculated as 87/5. Such weights were then calculated for all occupations within each group/category. The overall results do not change when using a weighting scheme based only on the group distribution. These results are available upon request.

[8] Many companies have Internet firewalls that do not allow for plug-ins as required by the web-based IAT.

magnitude as well as the occupational distribution. In a regression of a participation dummy on these characteristics only the estimates for the occupations "motor vehicle drivers" and "teachers at upper secondary school" and the callback rate for native Swedes are statistically significant (but not the ethnic difference).

3.3 Explicit attitudes and stereotypes

The recruiters were asked to state their explicit attitudes and stereotypes in three questions. First, in the *Feeling thermometer* they were asked to rate their positive or negative feelings on a ten-point scale (1 = very negative feelings, 10 = very positive feelings) toward Arab-Muslim minority men and native Swedish men, and then a difference between the two scales was calculated. This question is identical to the one used by Greenwald et al. (1998) and Nosek et al. (2005).

Second, in the *Hiring preference rating* participants had to choose which group they prefer when hiring people. Rather than being directly related to the IAT, hiring preferences are supposed to measure actual discrimination. The employers/recruiters had to choose one of the following five alternatives: "When hiring staff, I strongly prefer Arab-Muslim men (in Sweden) to native Swedish men", "When hiring staff, I moderately prefer Arab-Muslim men (in Sweden) to native Swedish men", "When hiring staff, I prefer Arab-Muslim men (in Sweden) and native Swedish men equally much", "When hiring staff, I moderately prefer native Swedish men to Arab-Muslim men (in Sweden)", and "When hiring staff, I strongly prefer native Swedish men to Arab-Muslim men (in Sweden)". The participants' responses were coded from -2 to +2, with 0 as an intermediate point reflecting no preference when hiring staff.

Third, in the *Performance stereotype rating* participants choose which of the two groups in question they consider to be more productive at work. The response alternatives were "Arab-Muslim men (in Sweden) are much more productive at work than native Swedish men"," Arab-Muslim men (in Sweden) are slightly more productive at work than native Swedish men", "Arab-Muslim men (in Sweden) and Swedish men are equally productive at work", "Swedish men are slightly more productive at work than Arab-Muslim men", "native Swedish men are much more productive at work than Arab-Muslim men". Again, the participants' responses were coded from -2 to +2, with 0 as an

intermediate point reflecting neutrality. These three questions are also transformed into dichotomous counterparts with 1 indicating at least a slight "preference" for native Swedish men.

Half of the employers explicitly state that they prefer hiring (54%), or have a more positive feeling towards (45%), a majority Swedish male over an Arabic/Muslim minority male, while a clear majority (77 percent) state that there are no productivity differences between the two, see Table 2. Hence, these answers indicate quite strong explicit negative attitudes toward the Arabic minority, but less of a negative explicit productivity stereotype of the same group. Since the share reporting negative attitudes toward the Arab/Muslim minority is quite high maybe measurement error in this variable is less of an issue when interpreting the empirical results.

*** Table 2 ***

4. The IAT and implicit discrimination

The Implicit Association Test (IAT) has been developed within social psychology to measure implicit attitudes and stereotypes against visible groups. It is a computer based test designed to specifically measure individual differences in relative associations between two concepts. It was first introduced by Greenwald et al. (1998) and has since become a widely used measure, particularly in sensitive areas such as attitudes and stereotypes toward social groups.[9]

The test is illustrated by the Arab-Muslim performance stereotype IAT found in Agerström et al. (2007) which also is the one used in this study. In this computer based version participants first classify, as fast as possible, Swedish and Arab/Muslim sounding names appearing in the middle of the screen according to the (target) category to which they belong, "Arab-Muslim men" or "Swedish men". In the next part of the IAT the participant now instead classifies words that are found being associated with high and low work productivity. These include words such as "lazy", "slow", "efficient" and "hard-working". In the third step names and high/low work productivity words appear at

[9] See http://implicit.harvard.edu for a test version of the IAT.

random. The intuitive idea is that it will be easier, and hence, go faster, to classify names and words that are compatible than those that are incompatible. The IAT measures every latency in response to the presented stimulus. For example, when two categories are "easily" associated in terms of their nominal features (Arab names + low work productivity and Swedish names + high work productivity) the participant classifies the stimuli much faster and with fewer errors than when they are not associated. A total of sixty stimuli are presented for the compatible and compatible part, respectively. The difference in response latencies, or rather a recalculation of this difference called Greenwald's D (as opposed to Cohen's d), between the compatible and incompatible parts is known as the IAT effect or the IAT score.

Greenwald et al (2003, 2006) have given bounds for the power of the IAT score, where below 0.15 is having non-existing, 0.15-0.35 is having slight, 0.35-0.60 is having moderate and an IAT-score over 0.60 is having strong negative implicit stereotypes towards the Arabic minority.[10] The IAT scores of the 193 recruiters participating in this study show that a very clear majority associate words signalling negative productivity, as "lazy" and "slow", with belonging to the Arab/Muslim minority. In fact, as much as seventy-seven percent have an IAT score above 0.15 (see Figure 1).

In the empirical analysis we use a standardised version of the IAT score as well as a discrete version where an IAT score above 0.4 is coded as one and otherwise as zero. 49 percent of the recruiters score above 0.4 on the IAT.[11]

5. Results

The empirical analysis starts by investigating to what extent the implicit discrimination measure, i.e. the IAT score, and the explicit discrimination measures, measuring relative preferences for and expected work productivity of majority Swedes and the Arab/Muslim minority, are correlated, see Table 3. We find a slight positive and statistically significant correlation, ranging between 0.15 and 0.31,

[10] These bounds closely correspond to a conservative version of the bounds of the more familiar Cohen's d.

[11] The choice of 0.4 is quite arbitrary, splitting the data in half. But it indicates having, at least, a moderate implicit negative stereotype of the Arab/Muslim minority.

between the IAT score and five of the explicit statements, with the exception being the "continuous" *performance stereotype*. The correlations among the explicit measures are around 0.3 for the *feeling thermometer* and the *hiring preference* and for the *hiring preference* and the *performance stereotype* but nonexistent for the *performance stereotype* and the *feeling thermometer*. Hence, these correlations indicate that the Arab-Muslim performance stereotype IAT measures something that is related to, but not the same as, the explicit measures.[12]

*** Table 3 about here***

The next step is to analyze to what extent the implicit and explicit measures correlate with behaviour, e.g. the decision on whom to call for interview, according to the model in Section 2. To investigate which, if any, of the implicit/explicit measures correlate with the callback for interview we estimate probit regressions separately for Swedish and Arab/Muslim named applicants (reporting marginal effects). The hypothesis being tested is that they should not be correlated with the callback rate for applicants with Swedish sounding names, but be negatively correlated with the callback rate for applicants with Arab/Muslim sounding names.

Table 4A, 4B, 4C and 4D summarize our findings. In Table 4A the callback dummy for Arab/Muslim named applicants is regressed on the "continuous" versions of the implicit/explicit variables, while in Table 4B the callback dummy for Arab/Muslim named applicants is regressed on the dummy versions of the implicit/explicit variables. In Table 4C we analyze whether there exist any interaction effects of the implicit and explicit discrimination measures. For comparison, in Table 4D the callback dummy for Swedish named applicants is regressed on the "continuous" and discrete versions of the implicit/explicit variables. All regressions are weighted according to the within group occupational distribution of the field experiment.

In the first column of Table 4A we regress the callback dummy on only the standardised implicit measure, using the full sample of 193 observations (Model A).

[12] It should be mentioned that the correlation between the implicit stereotype score and the explicit measures also is low ($r<0.2$) in a student sample, a group that has less incentives to misreport their explicit statements, see Agerström et al (2007).

In Carlsson and Rooth (2007) it was found to be important to control for the sex and age of the recruiter, for whether the workplace has less than 20 employees and for occupation fixed effects. The latter controls were important since "effects" of the other variables on the callback rate were found within, rather than between, occupations.[13] Hence, in Model B through E we have added these control variables to the regression. The estimates for these control variables are not commented on. Model B gives the estimates from the unweighted regression of the callback dummy on the implicit measure and the other variables, while Model C gives the estimates of the weighted counterpart.

Model D and E are the preferred specifications and correspond to Equation 2 in section 2, including the implicit as well as the explicit attitudes/stereotype measures into the list of regressors. The estimate of the implicit discrimination measure is about the same, around -0.03, in Model C through E. Hence, even though being somewhat imprecisely estimated, the magnitude of the estimate for the implicit discrimination measure is sizable. Further, it is stable as regards the inclusion of the explicit discrimination measures (compare the estimates from Model C through D). The economic interpretation of the estimate is that one standard deviation increase in implicit discrimination, which is the difference between the recruiter having no and having slight/moderate negative implicit productivity stereotypes (or between having slight/moderate and having strong such), renders a 3 percentage points lower probability to call the Arab/Muslim named applicant for an interview.[14] For the explicit discrimination measures we find no such results.[15] Given the fairly large share of recruiters with negative explicit attitudes toward Arab/Muslim men this result comes as somewhat of a surprise. Further, the results for the explicit measures are not altered if we exclude the implicit discrimination measure from the regression (not in the table).

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[13] One could also expect that the inclusion of occupation fixed effects would be important for the implicit and explicit stereotype measures since the "effect" of the stereotype might be more or less important in different occupations.

[14] The standard deviation of the IAT score is 0.34 and the bounds of the IAT effect suggested by Greenwald (2005) is 0.35 for having moderate and 0.6 for having strong implicit attitudes/stereotypes.

[15] However, for the feeling thermometer we find, opposite to what is expected, a significant positive effect.

In columns 6 through 10 we condition on that at least one applicant was called for an interview. These results are probably less flawed by a misclassification of the dependent variable, which might occur when firms receive a great number of applications.[16] It is then probably quite random who gets selected into the screening process. We therefore suspect that at least some firms that were found not to invite any application for interview would call our applicant(s) if they had actually read the applications. Hence, by restricting the sample to only firms that have called at least one applicant for interview we answer a somewhat different question but might get a "cleaner" picture of which implicit/explicit measures influence the callbacks for interview for applicants with Swedish and Arab/Muslim sounding names.

When comparing the estimate for the implicit discrimination measure in Model A and C we find that it is of the same magnitude. Hence, in this subsample of the data the correlation between the callback rate and the implicit discrimination measure exists within as well as between occupations. The estimate is stable across specifications also for this sample (compare the estimates from Model C through E). Recruiters with a one standard deviation higher level of implicit discrimination toward Arab/Muslim men in Sweden have a twelve percentage point lower probability to invite applicants with an Arab/Muslim sounding name for interview. For the explicit measures we find no correlations that are statistically significant. However, the estimate for the explicit performance stereotype is of sizable magnitude, indicating that this variable might be economically important.

Non-linearities and explicit/implicit interactions

Non-linear effects of the implicit discrimination measure have so far been neglected. When introducing a cubic of the standardized IAT score into the regression model C, for the full as well as the conditional sample, we find that the correlation is much stronger for values of the IAT effect above 0.6, i.e. for strong negative attitudes, see Figure 2 and 3. A related issue is whether there exists a significant interaction effect between the implicit and explicit discrimination measures. However, such an interaction effect is not easily

[16] Anecdotal evidence and the extremely low callback rates in some of our investigated occupations indicate that this is the case for some occupations.

interpreted with the "continuous" explicit and implicit discrimination measures. Therefore we have constructed binary explicit and implicit "equivalents".

The results of Table 4A are more or less replicated when using binomial versions of the implicit/explicit discrimination measures, see Table 4B. The implicit measure is coded as one if the recruiter has an IAT effect stronger than 0.4 and as zero otherwise. The explicit measures are coded as one if having an attitude/stereotype in favour of native Swedish men over Arab/Muslim men and zero otherwise. The coding of the implicit measure implies that we divide the recruiters into two groups, one with no implicit stereotype towards Arab/Muslim men and one with medium/strong negative such. It is then found that the group of recruiters with negative implicit stereotypes of Arab-Muslims has a 6-7 percentage points lower probability to invite Arab/Muslim named job applicants for interview compared to the group with no such negative implicit stereotypes. The results for the explicit measures are basically the same as in Table 4A and therefore not commented upon.

We then, one at a time, interacted the binary implicit discrimination measure with the explicit measures, see Model F through H in Table 4C. The interpretation of the discrimination measures is then the following. The estimate for the implicit discrimination measure then measures the effect of having moderate/strong negative implicit stereotypes but no negative explicit attitudes/stereotypes, while the sum of the estimates for the implicit discrimination measure, the explicit discrimination measure and the interaction of the two measures the difference in the callback rate if the recruiter has an implicit as well as an explicit negative attitude/stereotype as compared to having no such attitudes/stereotypes.

The results thus indicate that it is only when the implicit discrimination measure is interacted with the explicit stereotype measure that the interaction is important (see Model H). For example, using the full sample the recruiters having negative implicit stereotypes but not explicit ones have a four percentage points lower probability to call the Arab/Muslim named applicant for an interview compared to those recruiters that have neither stereotype. The difference in the probability of a callback for interview compared to recruiters with no implicit/explicit stereotypes increases to minus 11 percentage points when we instead focus on

recruiters that have both implicit and explicit negative stereotypes towards Arab/Muslim men. The qualitative picture is the same for the conditional sample.

We then turn to Table 4D and the correlation between the callback rate for those with native Swedish names and the implicit/explicit discrimination measures. For comparative purposes only Model D and E have been estimated. As expected, no statistically significant correlations are found between the callback rate and the implicit measure. The magnitude of the estimates are also close to zero, except for the estimates of the discrete measure using the full sample. The estimates of the explicit measures are again to some extent somewhat diverging. For the feeling thermometer we find a positive[17] correlation with the callback rate in the full data but not in the conditional data, while for the binary explicit performance stereotype we find a large negative value in the both samples (however, not significant).

*** Table 4A, 4B, 4C and 4D ***

Ethnic difference in callbacks for interview

In this section we analyze ethnic differences in the probability of being called for interview using probit regressions (reporting marginal effects) and how this difference varies when introducing the implicit and/or explicit discrimination measure(s) into the regression. The data include 193 observations for Arabic and Swedish sounding applications, respectively, which are stacked together into 386 observations. We start out by regressing the dummy variable indicating whether the person has been called for interview or not on only the ethnic indicator variable and then add, one at a time, the implicit and/or explicit discrimination measures and these measures interacted with the ethnic indicator. All estimations are clustered on the level of the firm and weighted according to Table 1.

The purpose of this strategy is to investigate how much of the ethnic difference that is being explained when we control for recruiters' implicit and explicit attitudes/stereotypes. The first column of Table 5 (Model A) reveals that applications with an Arabic name attached to it have a ten percentage point lower probability to

[17] This positive estimate could possibly be explained by the relative form of the explicit measure stating that the person have positive feelings towards native males relative to Arab-Muslim males.

be called for interview compared to applications with a Swedish sounding name. As is evident in the second and third column (Model B and C) this ethnic difference in callback for interview is dampened to five and eight percentage points when introducing the implicit and the explicit discrimination measure, respectively. When both discrimination measures are included at the same time (Model D) the ethnic difference in callback for interview is dampened even further to four percentage points. Hence, when being included separately the implicit measure and the explicit measures explain half respectively a quarter of the ethnic difference in callbacks for an interview. However, when included simultaneously they explain almost two thirds of this ethnic difference. The share explained is unaltered when using the conditional sample of 276 observations.

*** Table 5 ***

Measurement error in the explicit discrimination measures

Since the explicit discrimination measures are collected by interviewing recruiters it is likely that some are reluctant to reveal their true attitudes, for instance, for political correctness reasons. Such measurement errors will bias the estimates of the explicit discrimination measures. Also, the empirical analysis reveals that the estimates for the explicit measures are unstable across specifications, indicating measurement problems. A well known strategy is then to find an instrumental variable and estimate IV 2SLS, which helps in deleting the measurement error. This is achieved by having a second measure of explicit preferences that is not perfectly correlated with the first one. Such an instrumental variable exists for the explicit attitude as well as for the explicit stereotype measure. In the case of the explicit attitude measures there are two questions being asked. Hence, the *feeling thermometer* will be used as an instrument for the *hiring preference*. For the explicit stereotype measure the IAT measure will be used as an instrument.

We then estimate IV 2SLS for the full and conditional sample using the discrete versions of the implicit and explicit discrimination measures, see Table 6. Given the very low precision of the estimates and the variation in their magnitude across data sets it is not clear how to interpret the results from these estimations. However, we still cannot rule out the possibility that the insignificant estimates of the explicit measures in Tables 4 through 5 are explained by some sort of measurement error.

5. Conclusion

This study is the first, to the best of our knowledge, examining the correlation between implicit attitudes, explicit attitudes and discriminatory behaviour in a real hiring situation. We find strong and consistently negative correlations between the IAT score and the probability that the firm/recruiter invited the applicant with an Arab/Muslim sounding name for interview. The results imply that the probability to invite job applicants with names such as Mohammed or Reza decreases by six percentage points when the recruiter has at least a moderate negative implicit stereotype toward Arab/Muslim men in Sweden. Also the explicit stereotype measure seems to be correlated with the probability to invite job applicants with Arab/Muslim sounding names, even if the evidence is not as clear as for the implicit discrimination measure. The correlations found between the explicit attitude measures and the probability of inviting job applicants with Arab/Muslim sounding names are even weaker. Hence, combined with the results in Åslund and Rooth (2005) it seems as if recruiters are not affected by their negative attitudes towards the Arab/Muslim ethnic group when hiring, but are affected by productivity stereotypes of the group. What those productive stereotypes are, acting above the information about schooling and past experience found in the job application, needs to be further analysed.

Do these results imply the entry of an alternative discrimination theory not yet used in the field of economics or is it just the "old" theories working but in a new disguise? Our answer is a cautious yes to the first statement. The measured implicit stereotypes of the recruiters are correlated with the probability that employers call an applicant with an Arabic sounding name less often for interview, while our explicit discrimination measures are so to a much lesser extent. Further, we find only weak correlations between the IAT score and the explicit measures.

However, this result could also be explained by measurement error in the explicit measures. Statistical methods that try to correct for such bias only weakly indicate this to be the case. Hence, we cannot reject that both statements might be true. Still, most important, our study shows that the IAT is a very powerful tool for predicting discriminatory behaviour in the hiring situation.

Even if our results are stable across specifications they are taken from a small and restrictive sample of employers. More studies using the same, or a similar

strategy as ours are needed before fully accepting implicit discrimination as a new form of labor market discrimination.

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Figures:

Figure 1. The distribution of the IAT effect (D-measure) for stereotypes against Arabic minority men relative to native Swedish men.

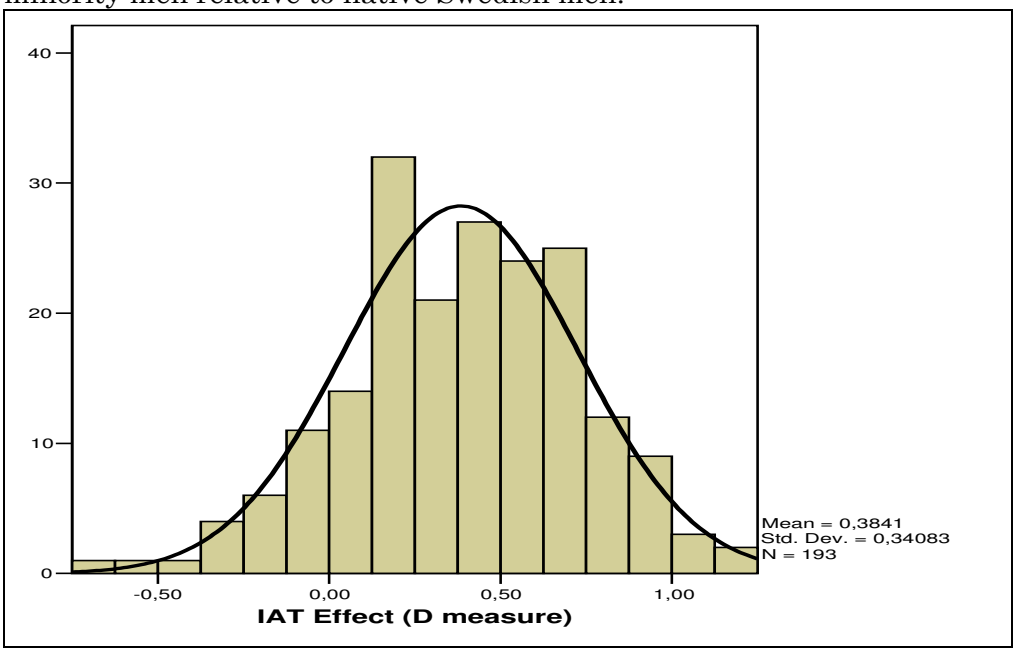
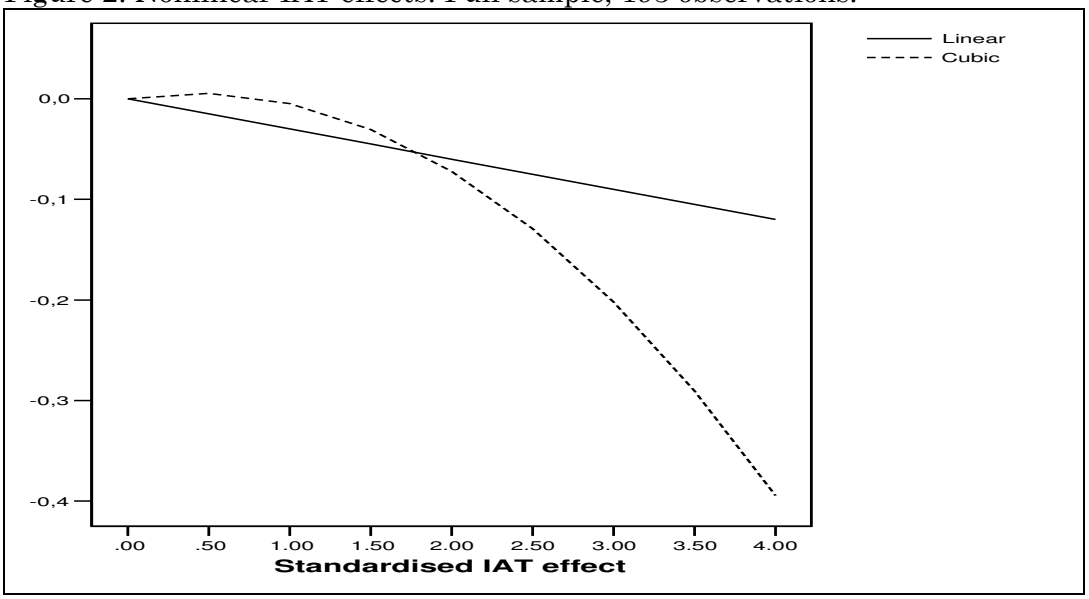
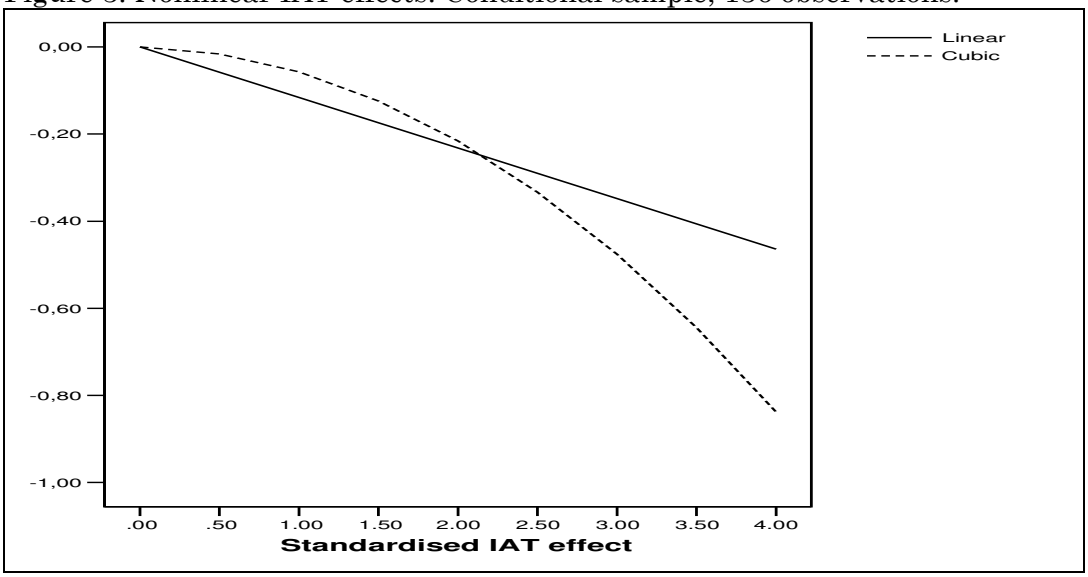


Figure 2. Nonlinear IAT effects. Full sample, 193 observations.



Note: The graph shows the predicted lowering of the hiring probability as the standardized IAT score increases. A standardized IAT effect of 2 is equivalent to having a strong implicit negative stereotype (IAT score>0.6). The estimates for the linear trend is taken from Table 4A, while the linear and cubic estimate is 0.026 and -0.031, respectively, in the cubic trend. These regressions estimates are available upon request.

Figure 3. Nonlinear IAT effects. Conditional sample, 136 observations.



Note: The graph shows the predicted lowering of the hiring probability as the standardized IAT score increases. A standardized IAT effect of 2 is equivalent to having a strong implicit negative stereotype (IAT score>0.6). The estimates for the linear trend is taken from Table 4A, while the linear and cubic estimate is -0.001 and -0.051, respectively, in the cubic trend. These regressions estimates are available upon request.

Tables:

Table 1. Participation in the two experiments and weights used in the analysis.

Called for interview Different outcomes	**Correspondence testing**	**IAT:** Invited	Participated (share %)	**Weights:** (SD)
Only Swedish applicant	204	184	56 (30)	3.6 (2.0)
Only Arab applicant	59	59	18 (31)	2.9 (1.3)
Both	221	192	62 (32)	3.2 (1.5)
Neither invited	1,014	294	57 (19)	17.3 (17.4)
Total	1,498	729	193 (26)	

*Note***:** From the field experiment we included all recruiters/companies from the original data (1,498) that were found in Statistics Sweden's firm register. The reason why not all firms were invited to participate is becasues they have not been located in the register (closed down). Since only a fraction (30%) of the group "neither invited" were invited to participate in taking the IAT we need to use weights in the analysis. The weights are group and occupation specific. For instance, a specific weight have been calculated for recruiters who belonged to the group "only Swedish applicant" and the occupation "computer specialist". Hence, these weights also correct for participation differences across groups and occupations.

Table 2. Explicit measures and their discrete counterparts. 193 cases.

	Values					
Explicit measure	<0	0	1	2	3-4	>4
Thermometer difference:	18	87	36	26	17	9
Dichotomous version	-	105	88	-	-	-
Hiring preference:	1	87	85	20	-	-
Dichotomous version	-	88	105	-	-	-
Performance stereotype:	6	164	16	7	-	-
Dichotomous version	-	170	23	-	-	-

Note: The weights from Table 1 are used.

Table 3. Correlation matrix showing the relationship between the Arab-Muslim performance stereotype IAT score and the three explicit measures and their discrete counterparts. 193 cases.

Variables	1	2	3	4	5	6	7
(1) Stereotype IAT	1	0.15*	0.22*	0.31*	0.31*	0.13	0.17*
(2) Feeling thermometer	0.15*	1	0.72*	0.30*	0.22*	-0.13	-0.02
(3) Discrete Feeling thermometer (if >0 eq 1)	0.22*	0.72*	1	0.33*	0.36*	-0.02	0.13
(4) Hiring preference	0.31*	0.30*	0.33*	1	0.90*	0.25*	0.28*
(5) Discrete Hiring preference (if >0 eq 1)	0.31*	0.22*	0.36*	0.90*	1	0.34*	0.37*
(6) Performance stereotype	0.13	-0.13	-0.02	0.25*	0.34*	1	0.90*
(7) Discrete Performance stereotype (if >0 eq 1)	0.17*	-0.02	0.13	0.28*	0.37*	0.90*	1

Note: * $p<0.05$. The weights from Table 1 are used.

Table 4A. The correlation between the callback rate for interview and the implicit and explicit attitude and stereotype measures. Percentage points. Full data of 193 observations.

	Marginal effect on callback when having an Arabic name									
	Full sample					Conditional sample				
Model:	A	B	C	D	E	A	B	C	D	E
Implicit measure:										
Standardised D-measure	-0.020	-0.063*	-0.030	-0.031*	-0.027	-0.123**	-0.089*	-0.116**	-0.123**	-0.119
	(0.026)	(0.038)	(0.019)	(0.017)	(0.019)	(0.050)	(0.046)	(0.050)	(0.051)	(0.054)
Explicit measures:										
Feeling thermometer	-	-		0.016*	-	-	-		0.013	-
				(0.009)					(0.031)	
Hiring preference	-	-	-	-	-0.007	-	-	-	-	-0.011
					(0.032)					(0.080)
Performance stereotype	-	-	-	-0.045	-0.023	-	-	-	-0.205	-0.170
				(0.035)	(0.040)				(0.133)	(0.119)
Other variables:										
Male recruiter	-	-0.308***	-0.175***	-0.143***	-0.169***	-	-0.289***	-0.331***	-0.311***	-0.313***
		(0.087)	(0.059)	(0.057)	(0.059)		(0.106)	(0.110)	(0.114)	(0.114)
Age of the recruiter	-	-0.002	-0.005**	-0.004**	-0.005**	-	0.000	-0.007	-0.005	-0.005
		(0.004)	(0.002)	(0.002)	(0.002)		(0.006)	(0.006)	(0.006)	(0.006)
Number of employees at workplace<20 eq 1	-	0.056	0.079	0.079	0.085	-	-0.040	-0.055	0.014	0.011
		(0.096)	(0.049)	(0.046)	(0.047)		(0.118)	(0.129)	(0.137)	(0.135)
Occupation fixed effects	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Weighted	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
No of cases	193	193	193	193	193	136	136	136	136	136

Notes: (***), (**) and (*) indicate the one, five and ten percent level of significance, respectively. Each column show the estimates from a regression of the callback rate on the set of variables given in the rows of the first column. All estimations also include occupation fixed effects. The estimates are marginal effects reported after the dprobit command in STATA 9. The weights from Table 1 are used, except for in Model B. In columns 1 through 5 the full sample of 193 observations is used, while in columns 6 through 10 we condition on at least one of the two applicants were invited for an interview and 136 observations are used. The predicted probability of being called for an interview is 0.08 and 0.54 in the full and conditional sample, respectively.

Table 4B. The correlation between the callback rate for interview and the implicit and explicit attitude and stereotype measures. Percentage points. Full data of 193 observations.

	Marginal effect on callback when having an Arabic name									
	Full sample					Full sample				
	Model:					Model:				
	A	B	C	D	E	A	B	C	D	E
Implicit measure:										
Discrete D-measure (if >0.4 eq 1)	-0.090	-0.086	-0.066*	-0.065*	-0.058	-0.201**	-0.142	-0.176*	-0.174*	-0.175*
	(0.057)	(0.078)	(0.041)	(0.037)	(0.040)	(0.093)	(0.092)	(0.095)	(0.097)	(0.097)
Explicit measures:										
Discrete Feeling thermometer (if >0 eq 1)	-	-		0.015*	-	-	-		-0.065	-
				(0.009)					(0.101)	
Discrete Hiring preference (if >0 eq 1)	-	-	-	-	-0.011	-	-	-	-	-0.085
					(0.032)					(0.103)
Discrete Performance stereotype (if >0 eq 1)	-	-	-	-0.041	-0.019	-	-	-	-0.143	-0.159
				(0.035)	(0.040)				(0.172)	(0.172)
Other variables:										
Male recruiter	-	-0.299***	-0.162***	-0.133***	-0.160***	-	-0.285***	-0.329***	-0.324***	-0.332***
		(0.087)	(0.059)	(0.056)	(0.058)		(0.106)	(0.108)	(0.111)	(0.111)
Age of the recruiter	-	-0.002	-0.004**	-0.004**	-0.004**	-	0.000	-0.006	-0.005	-0.006
		(0.004)	(0.002)	(0.002)	(0.002)		(0.006)	(0.006)	(0.006)	(0.006)
Number of employees at workplace<20 eq 1	-	0.048	0.079*	0.079*	0.086*	-	-0.057	-0.067	-0.029	0.003
		(0.095)	(0.049)	(0.046)	(0.046)		(0.118)	(0.126)	(0.133)	(0.133)
Occupation fixed effects	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Weighted	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
No of cases	193	193	193	193	193	136	136	136	136	136

Notes: (***), (**) and (*) indicate the one, five and ten percent level of significance, respectively. Each column show the estimates from a regression of the callback rate on the set of variables given in the rows of the first column. All estimations also include occupation fixed effects. The estimates are marginal effects reported after the dprobit command in STATA 9. The weights from Table 1 are used. The predicted probability of being called for an interview is 0.08 and 0.54 in the full and conditional sample, respectively.

Table 4C. Interaction effects. Percentage points.

	Marginal effect on callback when having a Swedish name							
	Full sample				Conditional sample			
	Model:				Model:			
	C	F	G	H	C	F	G	H
Comparison with Table 4B:								
Implicit measure:								
Discrete D-measure (if >0.4 eq 1)	-0.066*	-0.100*	-0.053	-0.039	-0.176*	-0.321**	-0.330**	-0.191*
	(0.041)	(0.062)	(0.064)	(0.038)	(0.095)	(0.130)	(0.154)	(0.102)
Explicit measures:								
Discrete Feeling thermometer (if >0 eq 1)	-	-0.007	-	-	-	-0.240*	-	-
		(0.048)				(0.133)		
Discrete Hiring preference (if >0 eq 1)	-	-	0.010	-	-	-	-0.236	-
			(0.049)				(0.146)	
Discrete Performance stereotype (if >0 eq 1)	-	-	-	0.022	-	-	-	-0.197
				(0.076)				(0.211)
Implicit/explicit Interaction effect	-	0.061	-0.022	-0.090	-	0.300	0.278	0.067
		(0.097)	(0.078)	(0.039)		(0.171)	(0.192)	(0.298)
Occupation fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No of cases	193	193	193	193	136	136	136	136

Notes: (***), (**) and (*) indicate the one, five and ten percent level of significance, respectively. Each column show the estimates from a regression of the callback rate on the set of variables given in the rows of the "first" column. All estimations also include occupation fixed effects. The estimates are marginal effects reported after the dprobit command in STATA 9. The weights from Table 1 are used. In columns 1 through 4 the full sample of 193 observations is used, while in columns 5 through 8 we condition on at least one of the two applicants were invited for an interview and 136 observations are used. The predicted probability of being called for an interview is 0.24 and 0.88 in the full and conditional sample, respectively.

Table 4D. The correlation between the callback rate for interview and the implicit and explicit attitude and stereotype measures. Native Swedish applicants. Percentage points.

	Marginal effect on callback when having a Swedish name							
	Full sample				Conditional sample			
	Model:				Model:			
	D	E	D	E	D	E	D	E
Comparison with Table 4A:								
Implicit measure:								
Standardised D-measure	-0.012	0.008	-	-	-0.005	-0.002	-	-
	(0.034)	(0.038)			(0.008)	(0.009)		
Explicit measures:								
Feeling thermometer	0.059**	-	-	-	0.008	-	-	-
	(0.024)				(0.006)			
Hiring preference	-	0.008	-	-	-	0.014	-	-
		(0.071)				(0.017)		
Performance stereotype	-0.027	0.004	-	-	-0.028	-0.021	-	-
	(0.065)	(0.076)			(0.025)	(0.022)		
Comparison with Table 4B:								
Implicit measure:								
Discrete D-measure (if >0.4 eq 1)	-	-	-0.056	-0.047	-	-	-0.014	-0.011
			(0.073)	(0.075)			(0.019)	(0.019)
Explicit measures:								
Discrete Feeling thermometer (if >0 eq 1)	-	-	0.171**	-	-	-	0.015	-
			(0.082)				(0.022)	
Discrete Hiring preference (if >0 eq 1)	-	-	-	0.087	-	-	-	0.027
				(0.086)				(0.024)
Discrete Performance stereotype (if >0 eq 1)	-	-	-0.113	-0.085	-	-	-0.071	-0.071
			(0.094)	(0.114)			(0.081)	(0.076)
Occupation fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No of cases	193	193	193	193	136	136	136	136

Notes: (***), (**) and (*) indicate the one, five and ten percent level of significance, respectively. Each column show the estimates from a regression of the callback rate on the set of variables given in the rows of the "first" column, including also the age and sex of the recruiter and the number of employees at the workplace. All estimations also include occupation fixed effects. The estimates are marginal effects reported after the dprobit command in STATA 9. The weights from Table 1 are used. In columns 1 through 4 the full sample of 193 observations is used, while in columns 5 through 8 we condition on at least one of the two applicants were invited for an interview and 136 observations are used. The predicted probability of being called for an interview is 0.08 and 0.54 in the full and conditional sample, respectively.

Table 5. How much of the ethnic difference in callbacks for interview is explained by implicit and explicit measures of discrimination? Percentage points.

	Full sample				Conditional sample			
	Model:				Model:			
	A	B	C	D	A	B	C	D
Arab/Muslim name	-0.102**	-0.050	-0.077	-0.036	-0.322***	-0.170*	-0.244***	-0.121
	(0.051)	(0.071)	(0.062)	(0.074)	(0.057)	(0.092)	(0.073)	(0.106)
Control for:								
Implicit measure + Arab*Implicit measure	No	Yes	No	Yes	No	Yes	No	Yes
Explicit measures + Arab*Explicit measures	No	No	Yes	Yes	No	No	Yes	Yes
% explained of total ethnic difference in callbacks for interview by implicit/explicit measures of discrimination	-	51	25	65	-	47	24	62
No of cases	386	386	386	386	272	272	272	272

Notes: (***), (**) and (*) indicate the one, five and ten percent level of significance, respectively. The data used is the pooled data of Arab/Muslim and Swedish named applicants. The first row gives the estimate for the Arab/Muslim dummy in a regression of the callback rate on the ethnic dummy and the set of discrimination measures given in first column (Pr(Callback=1)=a+b*Arab+c*ImplicitDisc+d*[Arab*ImplicitDisc]+e*ExplicitDisc+f*[Arab* ExplicitDisc]). The last row gives the share explained of the ethnic difference in callbacks when including the implicit and/or explicit discrimination measures. The estimates are marginal effects reported after the dprobit command in STATA 9. The weights from Table 1 are used.

Table 6. Measurement error in the explicit measures. IV-2SLS. Percentage points.

	Marginal effect on callback when having an Arabic name							
	Full sample				Full sample			
	Model:				Model:			
	A	B	C	D	A	B	C	D
Explicit attitude measure	-0.012	-0.006	-	-	-0.108	-0.206	-	-
	(0.040)	(0.161)			(0.101)	(0.224)		
Explicit stereotype measure	-	-	-0.059	-0.490	-	-	-0.152	-
			(0.041)	(0.421)			(0.161)	
Occupation fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IV-regression	No	Yes	No	Yes	No	Yes	No	Yes
t-value in first stage regression	-	3.5	-	2.3	-	4.2	-	0.2
No of cases	193	193	193	193	136	136	136	136

Notes: (***), (**) and (*) indicate the one, five and ten percent level of significance, respectively. The IV estimates of Model B and D are from a linear probability model, while Model A and C are the marginal effects reported after the dprobit command in STATA 9. The discrete versions of the explicit (and implicit) discrimination measures used in Table 4B are used. The weights from Table 1 are used and the models also include the age and sex of the recruiter and the number of employees at the workplace as well as occupation fixed effects. .

Appendix:

Table A1. Aggregated results for the correspondence testing

							Callback rates			
	Jobs No. (1)	Neither Invited No. (2)	At least one invited No. (3)	Equal Treatment No. (4)	Only Swedish-sounding name invited No. (5)	Only Arabic-sounding name invited No. (6)	Swedish-sounding name (4 + 5)/(1)	Arabic-sounding name (4 + 6)/(1)	Relative (Swedish)/(Arabic)	χ^2
Computer professionals	106	71	35	9	14	12	0.22	0.20	1.10	0.2
Teachers (math and science) [a]	42	16	26	17	7	2	0.57	0.45	1.26	2.8
Business sales assistants	278	164	114	57	39	18	0.35	0.27	1.28	7.7***
Preschool Teachers	184	64	120	76	36	8	0.61	0.46	1.33	17.8***
Accountants	186	155	31	10	14	7	0.13	0.09	1.41	2.3
Nurses	150	95	55	30	20	5	0.33	0.23	1.43	9.0***
Teachers - upper secondary school	64	41	23	10	11	2	0.33	0.19	1.75	6.2**
Teachers (language)[a]	60	26	34	9	19	6	0.47	0.25	1.87	6.8***
Construction workers	64	44	20	7	12	1	0.30	0.12	2.38	9.3***
Restaurant workers	140	128	12	3	8	1	0.08	0.03	2.75	5.4**
Motor-vehicle drivers	78	59	19	6	13	0	0.24	0.08	3.17	13.0***
Shop sales assistants	200	167	33	5	24	4	0.14	0.04	3.22	14.3***
Total	1,552	1,030	522	239	217	66	0.29	0.20	1.50	83.7***

Source: Results from Carlsson and Rooth (2007).

Notes: The null hypothesis is "Both individuals are treated unfavorably equally often", that is, (5) = (6). The critical value of the χ^2 at the one percent level of significance is 6.63 (***) and at the five percent level of significance is 3.84 (**). (a) Upper level of compulsory school.

Table A2. Is participation selective? Regression of participation (0/1 variable) in taking the IAT on a set of recruiter/company characteristics.

	Mean of characteristics		Estimate
	Participants	Noparticipants	
Callback rate Arab/Muslim	0.41	0.32	0.011
			(0.038)
Callback rate native Swede	0.56	0.50	0.075*
			(0.038)
Male responsible for hiring	0.56	0.61	-0.009
			(0.028)
Number of employees at workplace<20	0.49	0.57	-0.001
			(0.037)
Occupations:			
Shop sales assistants	0.11	0.10	b.m.
Construction workers	0.03	0.03	-0.049
			(0.108)
Motor vehicle drivers	0.02	0.05	-0.154*
			(0.091)
Business sales assistants	0.15	0.20	-0.092
			(0.064)
Preschool teachers	0.17	0.15	-0.033
			(0.038)
Teachers (science)	0.06	0.03	0.114
			(0.100)
Teachers (language)	0.06	0.05	0.009
			(0.087)
Teachers (upper secondary school)	0.12	0.04	0.250*
			(0.086)
Cleaning	0.04	0.04	0.011
			(0.096)
Computer specialists	0.05	0.07	-0.074
			(0.082)
Accountants	0.07	0.12	-0.105
			(0.071)
Restaurant workers	0.03	0.03	-0.044
			(0.107)
Nurses	0.09	0.09	0.050
			(0.074)
No of cases	193	536	729

Notes: The first and second column give the means of observable characteristics of participants and non-participants, respectively. The third column gives the estimates from a regression of the participation dummy, being one if having taken the IAT and zero otherwise, on the observable characteristics in the field experimental data (standard errors in parentheses). *) indicate the ten percent level of significance.